REBUTTAL TESTIMONY OF

JOSEPH M. LYNCH

ON BEHALF OF

DOMINION ENERGY SOUTH CAROLINA, INC.

DOCKET NO. 2019-184-E

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Joseph M. Lynch and my business address is 220 Operation Way, Cayce, South Carolina.

Q. ARE YOU THE SAME JOSEPH LYNCH THAT OFFERED DIRECT TESTIMONY IN THIS DOCKET?

A. Yes, I am.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to discuss the response of Dominion Energy South Carolina, Inc. ("DESC" or the "Company") to certain issues raised in 1) the direct testimony of Mr. Brian Horii filed on behalf of the South Carolina Office of Regulatory Staff ("ORS"), and 2) the direct testimony of Mr. Ed Burgess filed on behalf of the South Carolina Solar Business Alliance ("SCSBA").

REBUTTAL TO TESTIMONY OF MR. BRIAN HORII

Q. ON PAGE 33, LINE 15 MR. HORII DISAGREES THAT SOLAR HAS A ZERO CAPACITY VALUE AND CLAIMS THAT THE COMPANY'S ASSUMPTIONS ARE "OVERLY SIMPLISTIC AND DETERMINISTIC." DO YOU AGREE?

A. No, I do not. In my Exhibit No. ___ (JML-1) I provide a thorough and detailed analysis of a composite solar profile and its impact on system load. The profile represents a composite of 7 solar farms for the period August 1, 2017 through July 31, 2018, which was the latest solar data available at the time the study was conducted. The results of this analysis were used to develop the Company's 2019 Integrated Resource Plan ("IRP"). In the addendum to my Exhibit No. __ (JML-1), I present a thorough analysis of another composite solar profile of 21 solar farms for the period June 1, 2018 through May 31, 2019. This was the latest solar data available for this filing. The results of this analysis will be reflected in the Company's 2020 IRP. Finally, I presented a similar analysis in Docket No. 2018-2-E using a solar profile for the period January 1, 2017 through December 31, 2017. All three analyses represent thorough and detailed studies of the characteristics of solar generation and its impact on the Company's system load. All three support the same conclusion that solar does not avoid the Company's need for winter capacity, does not avoid any capacity costs, and therefore has a zero-capacity value. I do not consider this work overly simplistic; instead, it represents

a direct analysis of actual solar profiles and provides clear and irrefutable evidence that solar has a zero-capacity value on DESC's system.

Q. ON PAGE 34, LINE 21 MR. HORII STATES THAT "THE DESC APPROACH OF ONLY ANALYZING THE SUMMER OR WINTER SEASONAL PEAK IS A SIMPLISTIC WAY OF EVALUATING THE NEED FOR AND VALUE OF CAPACITY RESOURCES." DO YOU AGREE?

A. No, I do not. Load on the DESC system is subject to significant winter spikes during very cold weather. It therefore was critical in developing the Company's need for capacity to distinguish between base capacity needs and peaking needs. In my Exhibit No. ____ (JML-3), I present the Company's Reserve Margin Study, which is produced to assist the Company in making prudent decisions about the needs of its system for additions to its generating fleet. The study combines the Company's generator outage experience and load experience over the period 2010 through 2017, to develop seasonal probability distributions to determine base reserves. This analysis went beyond analyzing just the summer and winter seasonal peaks; rather, it also analyzed load and plant outages on every day in the 8-year period. The base reserves that were determined used the 95^{th} and 97^{th} percentiles in these seasonal probability distributions.

To analyze the risk presented by extreme weather both in the summer and winter, the Company conducted statistical regression studies to develop seasonal probability distributions of demand. Seasonal outage probability distributions also were developed for capacity based on the Company's forced outage experience with generators. In my direct testimony (page 20, line 19), I explain how I used the Convolution Formula from statistical theory to combine the probability distribution of demand with the outage probability distribution for capacity into their joint probability distribution. From this data, I calculated a 3.2% probability of demand exceeding supply in winter. These are sophisticated statistical and probabilistic techniques that are most appropriate and reasonable for use in studies of this nature and certainly are not simplistic as Mr. Horii suggests.

Q. ON PAGE 35, LINE 10 MR. HORII STATES THAT YOUR EFFECTIVE LOAD CARRYING CAPACITY ("ELCC") CALCULATION "DEMONSTRATES SOLAR PROVIDES CAPACITY VALUE EQUAL TO 24% OF NAMEPLATE CAPACITY." DO YOU AGREE?

A. No, I do not. Actually, I find his statement to be ironic because I only calculated the ELCC to demonstrate that the loss of load expectation ("LOLE") method, which underpins the ELCC calculation, does not work for the DESC system. This is primarily because DESC needs capacity in winter. DESC has 1,048 MW of utility scale solar nameplate capacity in its resource plan. Taking 24% of

this nameplate capacity represents about 252 MW of ELCC solar capacity. On a cold, winter morning when the system is peaking before sunrise, our dispatchers obviously cannot deploy this 252 MW ELCC of capacity because it simply is not generating any electricity before sunrise. In sum, the theoretical ELCC capacity overstates the Company's capacity to serve the winter peak by 252 MW and supports my statement that the ELCC calculation does not work for DESC's system.

Q. ON PAGE 35, LINE 19 MR. HORII STATES THAT NOT PROVIDING THIS 24% SOLAR CREDIT "WOULD BE UNFAIR TO SMALL POWER PRODUCERS AND VIOLATE THE NON-DISCRIMINATORY GUIDELINE OF SECTION 58-41-20(A) OF ACT 62." DO YOU AGREE?

A. No, I do not. The relevant passage from Section 58-40-20(A) states as follows.

> Any decisions by the commission shall be just and reasonable to the ratepayers of the electrical utility, in the public interest, consistent with PURPA and the Federal Energy Regulatory Commission's implementing regulations and orders, and nondiscriminatory to small power producers; and shall strive to reduce the risk placed on the using and consuming public.

Paying the 24% solar credit to new solar providers when there are no avoided capacity costs means DESC's customers will be paying above avoided cost for QF power. Doing this would be unjust and unreasonable to ratepayers, would not be in the public interest, and would be inconsistent with PURPA and FERC regulations.

Therefore, not providing the 24% solar credit suggested by Mr. Horii would not be unfair and discriminatory to small power producers; rather, Mr. Horii's suggestion, if approved, would result in a clear subsidy to solar developers and a shifting of costs to DESC's customers.

REBUTTAL TO THE TESTIMONY OF MR. ED BURGESS

Q. ON PAGE 46, LINE 10, MR. BURGESS STATES THAT "CAPACITY VALUE IS THEN ALLOCATED TO THESE TIME PERIODS [I.E. SUMMER AND WINTER] ON THEIR RELATIVE WEIGHTINGS AND IN TURN USED FOR DETERMINING THE AVOIDED COST RATES FOR CAPACITY." DO YOU AGREE?

A. No, I do not. DESC does not allocate capacity value or avoided capacity costs. Instead, DESC has concluded and made clear that its winter peak forecast is higher than its summer peak forecast and that its winter peak can experience spikes causing the need for a 21% winter reserve margin. DESC also has demonstrated that the 1,048 MWs of solar nameplate capacity in its resource plan will increase system summer resources by 482 MW, i.e. 46%, while adding nothing to winter system capacity. Based on all these factors, DESC determined that incremental resources must help serve winter demands in order to have capacity value. Since

solar cannot be depended on to help serve winter peaks, solar will not allow DESC to avoid any of its future capacity needs and therefore produces zero avoided costs.

Q. ON PAGE 46, LINE 18 MR. BURGESS STATES THAT "DESC USES AN APPROACH THAT UNFAIRLY DISCOUNTS SUMMER CAPACITY VALUE AND MAY IMPOSE UNREASONABLE COSTS ON RATEPAYERS" DO YOU AGREE?

A. No, I do not. In the context of an avoided cost hearing, summer capacity value must be interpreted as avoided capacity costs derived from avoiding the addition of summer capacity. Because the need for additional capacity on the DESC system is being driven by winter needs, summer avoided capacity costs are zero and the suggestion that zero unfairly discounts the value of solar in the summer simply ignores the characteristic of DESC's system and the needs of its customers. If DESC were to pay for summer capacity, then DESC would be paying solar QFs above the Company's avoided costs. Not only is this directly contrary to the requirements of PURPA and Act No. 62, such a result definitely would impose unreasonable costs on ratepayers.

Q. ON PAGE 47, LINE 21 MR. BURGESS STATES THAT PLANNING SOLELY FOR THE ONE PEAK HOUR OF THE YEAR "WOULD IGNORE MANY OTHER HOURS OF THE YEAR THAT HAVE SMALLER, BUT STILL MEANINGFUL PROBABILITIES OF AN OUTAGE." DO YOU AGREE?

A. Yes, I do and, fortunately, contrary to what Mr. Burgess states, DESC does not plan for its future system needs by planning solely for the one peak hour of the year. In my Exhibit No. ____ (JML-3), I present the Company's Reserve Margin Study, which analyzes the need for capacity around the year based on load and supply outages as well as the risks associated with peaks due to abnormal weather and the probability of outages. Obviously, if a system has enough capacity to supply the highest load on the system, it also will have enough capacity to serve a lesser load. The converse of this obvious statement is not true, however. If DESC were to analyze lesser system loads during a shoulder month, such as April for example, the analysis would not help the Company determine how much capacity it will need during the much higher winter peak. It is true that there is a positive probability of outage at every hour no matter the size of the load. But managing this risk is more a function of deploying the capacity DESC has on its system, deciding when to perform planned maintenance activities, how much operating reserves are needed, and what units to commit for the day.

Q. ON PAGES 47 THROUGH 50, MR. BURGESS DISCUSSES THE CLOSENESS OF DESC'S SUMMER AND WINTER PEAK FORECASTS AND ON PAGE 50, LINE 6 CONCLUDES THAT "DESC IS NOT PROPERLY ASSESSING THE CAPACITY CONTRIBUTIONS OF QFs." DO YOU AGREE?

A. No, I do not. First, the term "capacity contributions of QFs" is a nebulous concept and irrelevant to these discussions. If, however, Mr. Burgess is referring to the more precise terminology "avoided capacity costs of QFs," then it is clear DESC has properly assessed the avoided capacity costs of QFs with the goal of ensuring that ratepayers are held harmless with the purchase of QF power, i.e., so they do not pay more than the Company's avoided costs. Although I agree with Mr. Burgess that the winter and summer peak forecasts are relatively close in size when it comes to the need for summer versus winter capacity, there is more than the relative peak demands to consider. As I pointed out earlier in my testimony, DESC must also consider that the winter peak can experience spikes causing the need for a 21% winter reserve margin, and that the significant amount of solar generation in our resource plan is unable to help DESC meet its customers' needs for capacity in winter.

Q. ON PAGE 50, MR. BURGESS STATES "FOR ITS CAPACITY STUDY, DESC EMPLOYS A SINGLE YEAR OF LOAD DATA IN ORDER TO JUSTIFY THE POSITION THAT SOLAR RESOURCES HAVE NO IMPACT ON CAPACITY NEEDS." DO YOU AGREE?

A. No, I do not. In my Exhibit No. ___ (JML-1), I present DESC's study of solar output and its impact on system load. The report's conclusions are based on a composite profile of 7 solar farms over the annual period August 1, 2017 through July 31, 2018. In the addendum to the report I present results based on the analysis of a composite profile of 21 solar farms over the annual period June 1, 2018 through May 31, 2019. Finally, in Docket No. 2018-2-E another study was filed using a solar profile for the period January 1, 2017 through December 31, 2017. The analysis of all three annual periods represents a thorough and detailed study of the characteristics of solar generation and its impact on the Company's system load. The conclusion of all three of these analyses is the same, i.e., that solar resources have no impact on DESC's capacity needs.

Q. ON PAGE 55, LINE 11, MR. BURGESS CLAIMS THAT DESC OBTAINED AN ELCC OF 37% FOR THE FIRST 500 MW AND 11.8% ON THE NEXT INCREMENT OF 500 MW PRODUCING AN AVERAGE OF 24% ON 1,000 MW. "THUS, ACCORDING TO DESC'S OWN TESTIMONY, SOLAR PV HAS A MEANINGFUL, NON-ZERO CAPACITY VALUE." DO YOU AGREE?

A. No, I do not. DESC's resource plan requires new winter capacity and since solar cannot be depended on to produce power during winter peak times, solar cannot avoid any capacity in the resource plan and therefore its avoided capacity cost is zero. Zero avoided capacity cost means zero capacity value.

Q. ON PAGE 58, LINE 2, MR. BURGESS USES A 24 MW CAPACITY RESOURCE IN HIS OPTION 1, WHICH HE STATES "EQUATES TO THE 24% ELCC VALUE OF SOLAR." IS THIS THE CORRECT USE OF ELCC RESULTS?

A. No, it is not. As I testified in my direct testimony, the first 500 MW of solar has a 37% ELCC value while the next increment of 500 MW of solar has only an 11.8% ELCC value. This clearly demonstrates that, as more solar is added to the system, the ELCC value goes down. The 24% ELCC value used by Mr. Burgess corresponds to the addition of 1,000 MW of solar. However, what Mr. Burgess should be using to conduct his ELCC analysis is the ELCC value for an increment

of 100 MW of solar relative to the 1,048 MW of solar already in DESC's resource plan. The ELCC value for this incremental solar not only will be much lower than the 24% he uses in his analysis, but also lower than 11.8%. The following table shows the ELCC value associated with this 100 MW increment in solar.

Table 1

ELCC Results				
Step	Case	Description	Capacity	LOLH
1	Base	1,000 MW Solar	5,066 MW	2.86
2	Change	1,100 MW Solar	5,066 MW	2.78
3	Adjusted	1,100 MW Solar	5,062 MW	2.86
		ELCC Value	4 MW	

Thus, instead of using 24% and 24 MW in his calculation of avoided capacity costs for solar, Mr. Burgess should be using only 4% or 4 MW.

Q. ON PAGE 54, LINE 9 MR. BURGESS STATES THAT "DESC USED LOLH AS ITS TARGET [RELIABILITY] METRIC, NOT LOLE. I BELIEVE THIS COULD BE A POTENTIAL SOURCE OF BIAS AGAINST SOLAR" DO YOU AGREE?

A. No, I do not. It is true that LOLH uses all 8,760 hours of load in the year, including hours when the sun is not shining, when solar is not producing power, and consequently when solar is not affecting the system load or adding to the ELCC value. However, I do not consider this bias. Rather, it simply is a characteristic of solar PV technology. Even so, it is not difficult to compare the LOLH results with

results using the LOLE metric, which uses only the peak load of each day of the year, i.e., 365 load hours. The following table shows these comparable results.

Table 2

ELCC Results				
Step	Case	Description	Capacity	LOLE
1	Base	1,000 MW Solar	5,517 MW	0.104
2	Change	1,100 MW Solar	5,517 MW	0.103
3	Adjusted	1,100 MW Solar	5,514 MW	0.104
		ELCC Value	3 MW	

In my Exhibit No. ____ (JML-1) where I directly analyze solar load characteristics and impacts on system load, I show that solar does not affect the daily peak on many days of the year because, on non-summer-like days, the system often peaks in the morning before sunrise or late in the evening after sunset. Thus, the ELCC value under LOLE suffers from many days where solar has no impact on load and the resulting ELCC value is 3% or 3 MW out of a total of 100 MW of nameplate capacity.

Q. ARE YOU SUGGESTING THAT, WITH THE CHANGES ABOVE, I.E., USING A 4% OR A 3% ELCC VALUE, THE ELCC METHOD CAN BE USED TO CALCULATE AVOIDED CAPACITY COSTS FOR SOLAR?

A. No, I am not. As I have previously stated, the ELCC should not be used to establish the capacity value of solar on DESC's system. Solar has a zero avoided

capacity cost, but, as demonstrated above, the ELCC calculation overstates the capacity value of solar for DESC's system.

Q. ON PAGES 52 THROUGH 54, MR. BURGESS EXPLAINS THAT LOLE IS A COMMONLY USED RELIABILITY METRIC FOR RESOURCE PLANNING AND THAT 14 OUT OF 21 RELIABILITY ASSESSMENT AREAS USE IT. SHOULD DESC ALSO USE IT FOR RESOURCE PLANNING?

A. Mr. Burgess' explanation also shows that 7 out of 21 reliability assessment areas do not use LOLE, just as DESC does not. This demonstrates that it is reasonable for an electric utility to not use LOLE in its reliability assessment. Even so, DESC could use the LOLE methodology, although it would be far from the preferred approach. In my Exhibit No. ____ (JML-4), I performed an LOLE Study for DESC which resulted in a range of reserve margins of 16.6% to 20.5% with a middle value of 18.2%. These results were based on the analysis of 30 historical load shapes on the DESC system scaled to the 2019 forecast. Thus, the LOLE results were all based on normal weather loads. Considering the significant risk related to winter spikes, an increase in reserve margin beyond 18.2% to at least to 21% is certainly justifiable. However, the LOLE method, with its multitude of calculations, is like the proverbial black box in analytics and would preclude DESC from applying any studied judgment or experience to this analysis. By comparison, the

method currently used by DESC addresses the components of risk directly by analyzing the probabilistic impact of weather on seasonal peak demand and the outage probability distribution of generation and the need for peaking resources as opposed to base-type resources. Accordingly, requiring the use of the LOLE method would be a step backwards for DESC, and therefore this suggestion should be rejected.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.